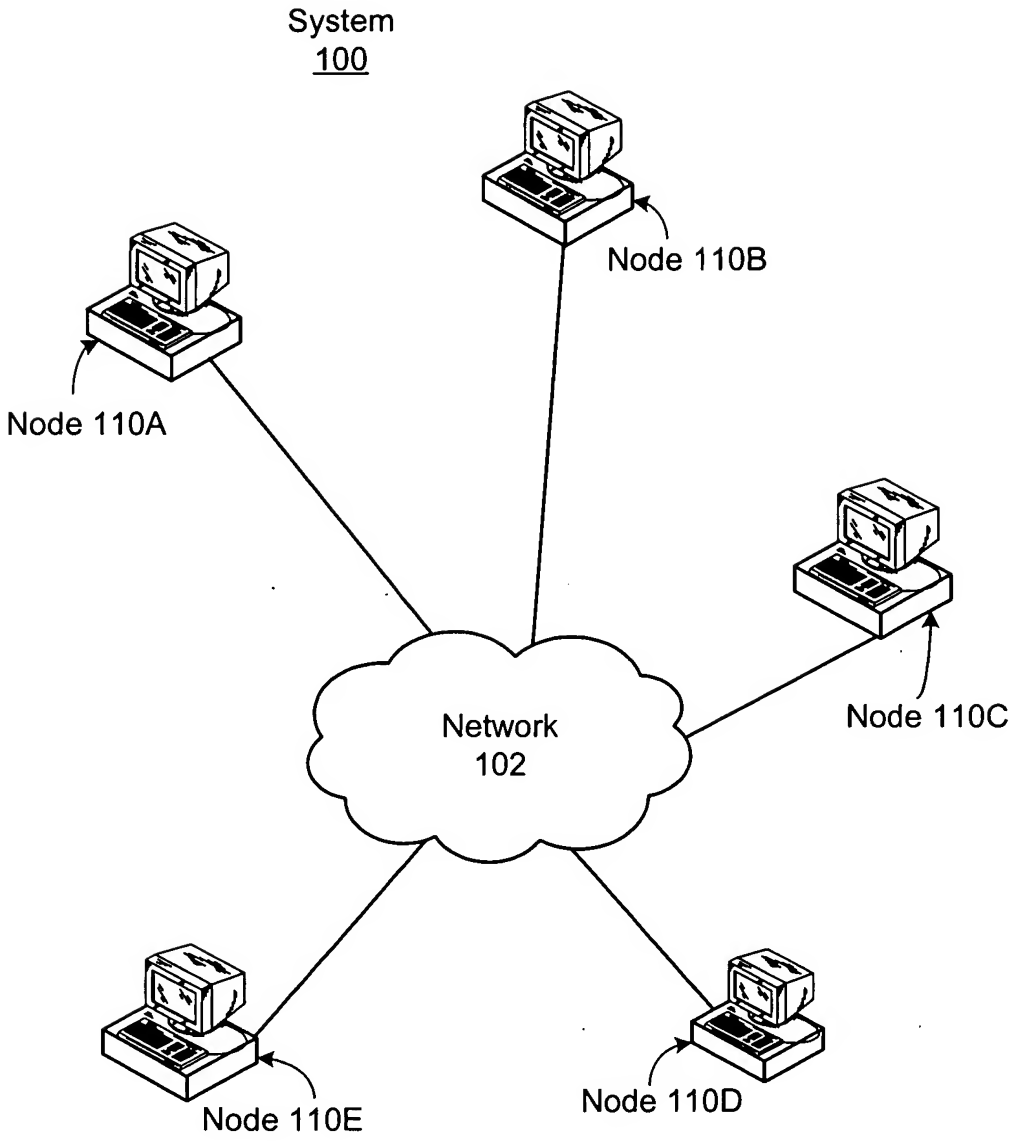
System
100
Node 110B
Node 110A
Node 110C
Network
102
Node 110E
Node 110D

FIG. 1

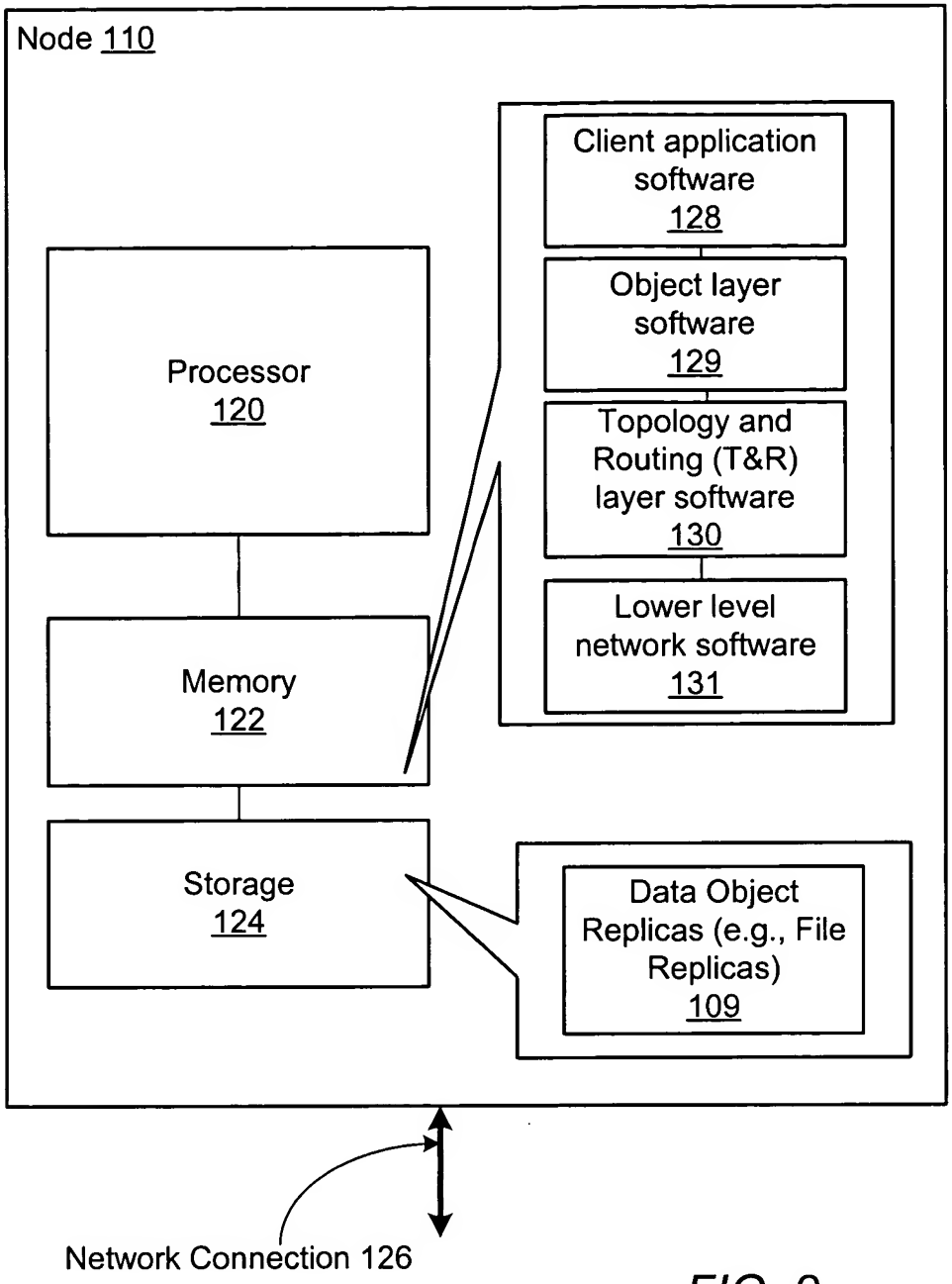
Node 110
Client application software 128
Object layer software 129
Topology and Routing (T&R) layer software 130
Lower level network software 131
Processor 120
Memory 122
Storage 124
Data Object Replicas (e.g., File Replicas) 109
Network Connection 126

FIG. 2

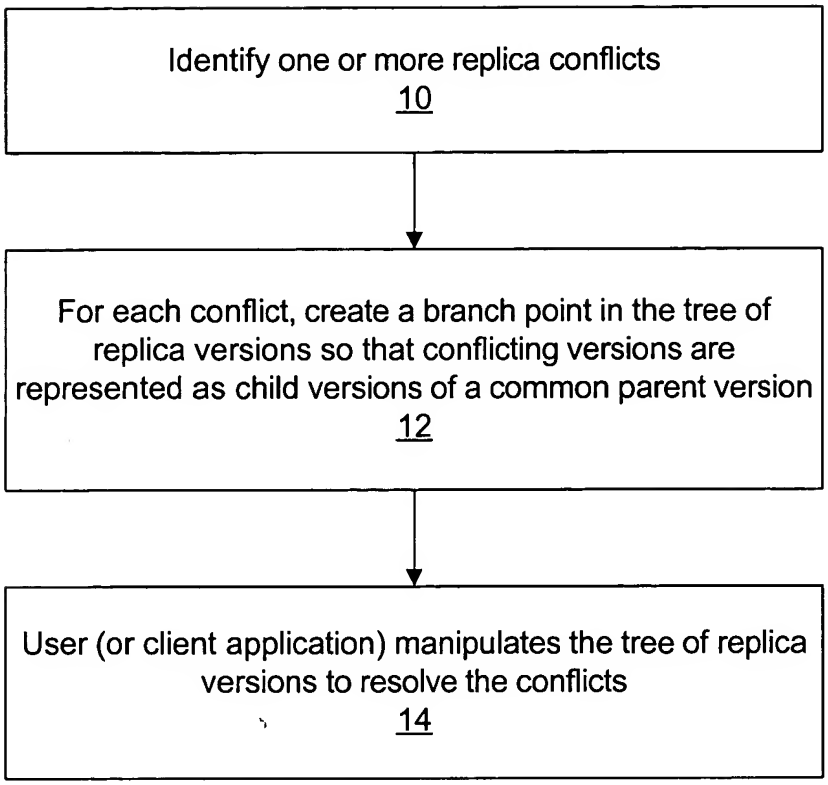
Identify one or more replica conflicts
10
For each conflict, create a branch point in the tree of replica versions so that conflicting versions are represented as child versions of a common parent version
12
User (or client application) manipulates the tree of replica versions to resolve the conflicts
14

FIG. 3A

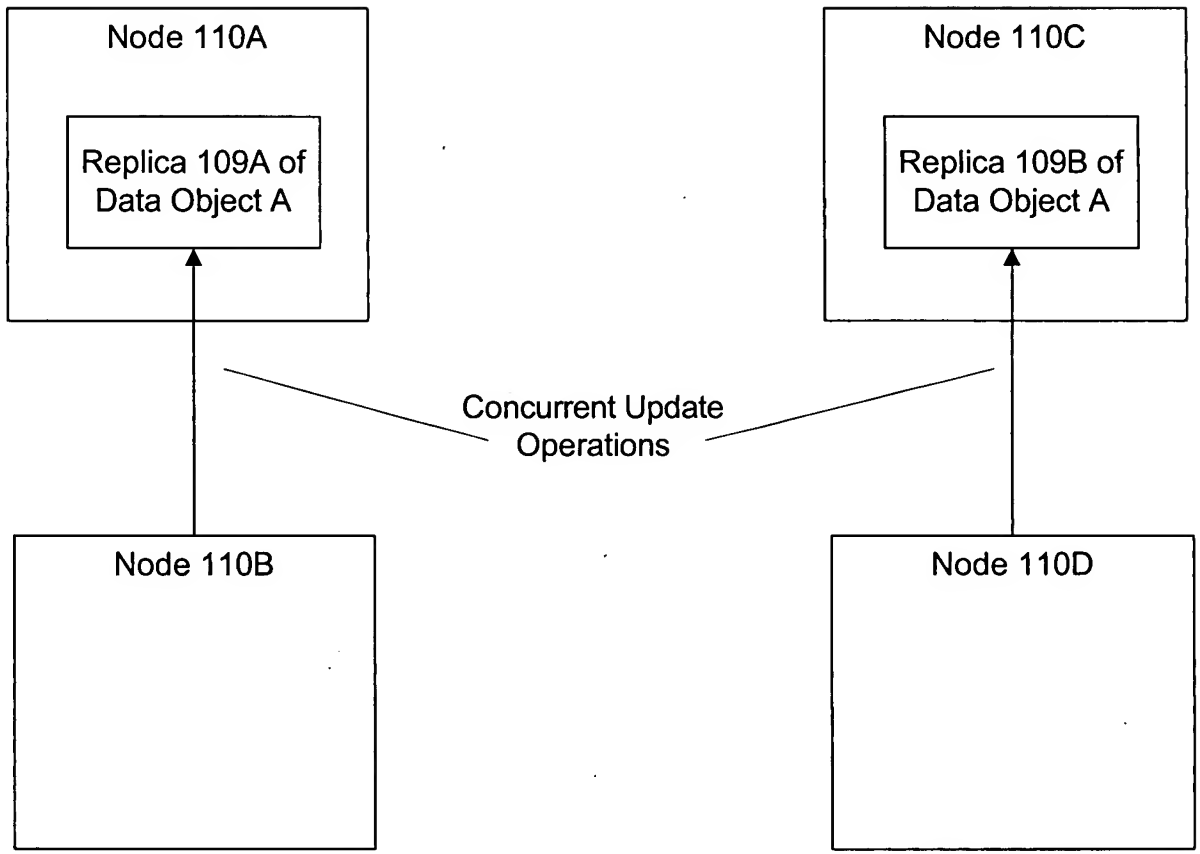
Node 110A
Replica 109A of Data Object A
Node 110C
Replica 109B of Data Object A
Concurrent Update Operations
Node 110B
Node 110D

FIG. 3B

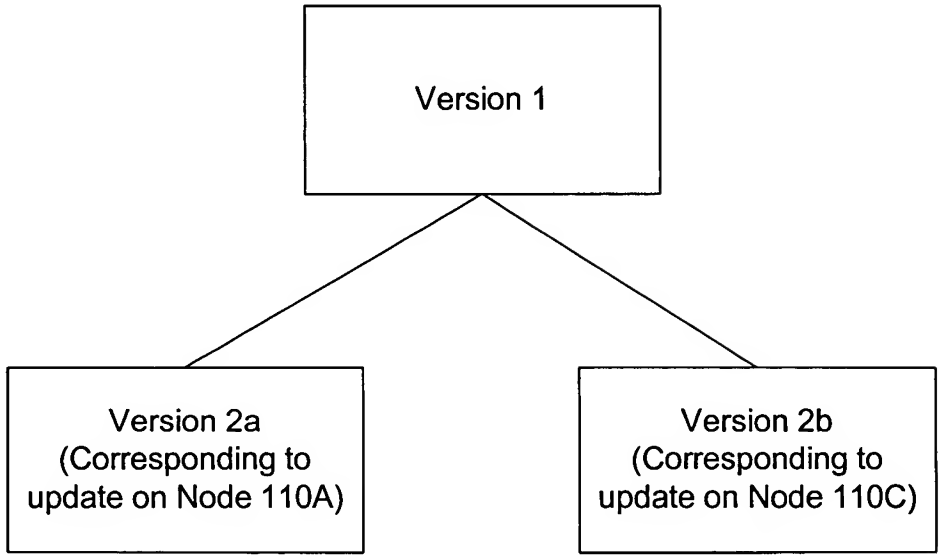
Version 1
Version 2a
(Corresponding to
update on Node 110A)
Version 2b
(Corresponding to
update on Node 110C)

FIG. 3C

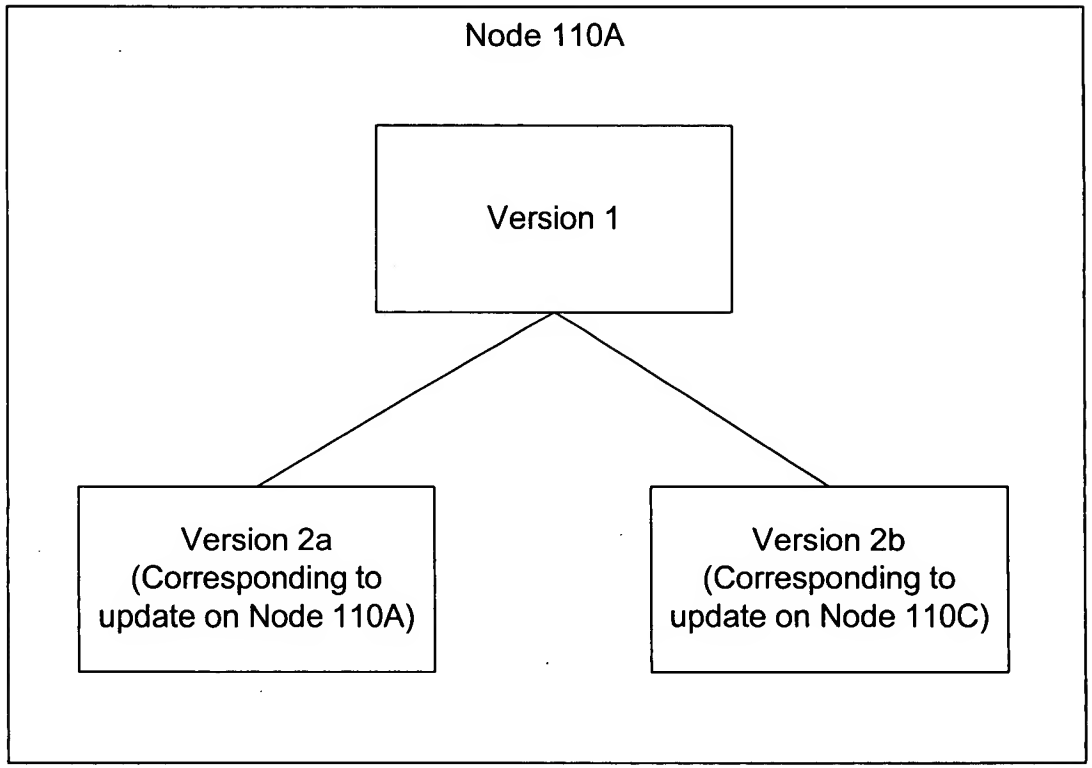
Node 110A
Version 1
Version 2a
(Corresponding to
update on Node 110A)
Version 2b
(Corresponding to
update on Node 110C)

FIG. 3D

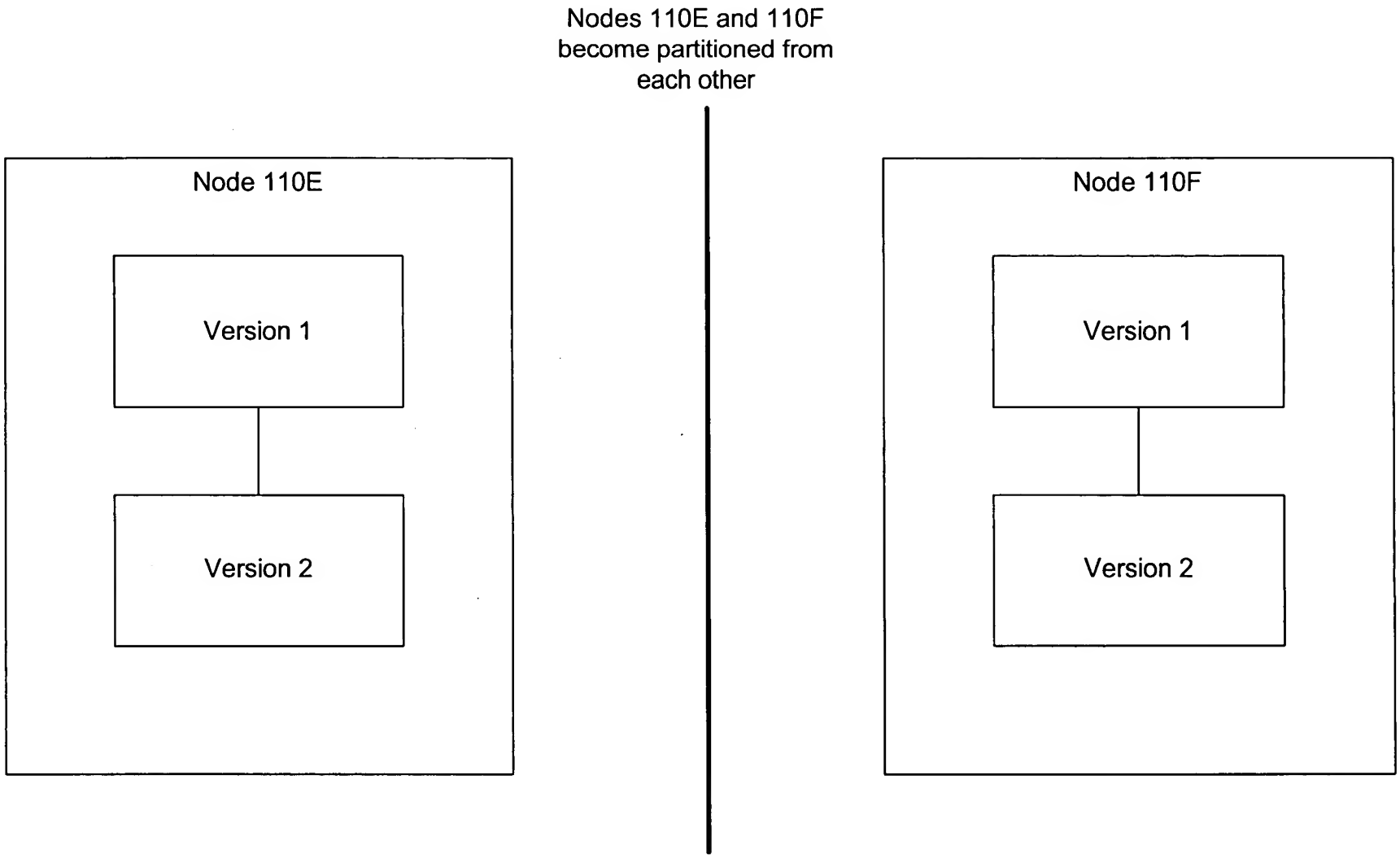
Nodes 110E and 110F become partitioned from each other
Node 110E
Version 1
Version 2
Node 110F
Version 1
Version 2

FIG. 3E

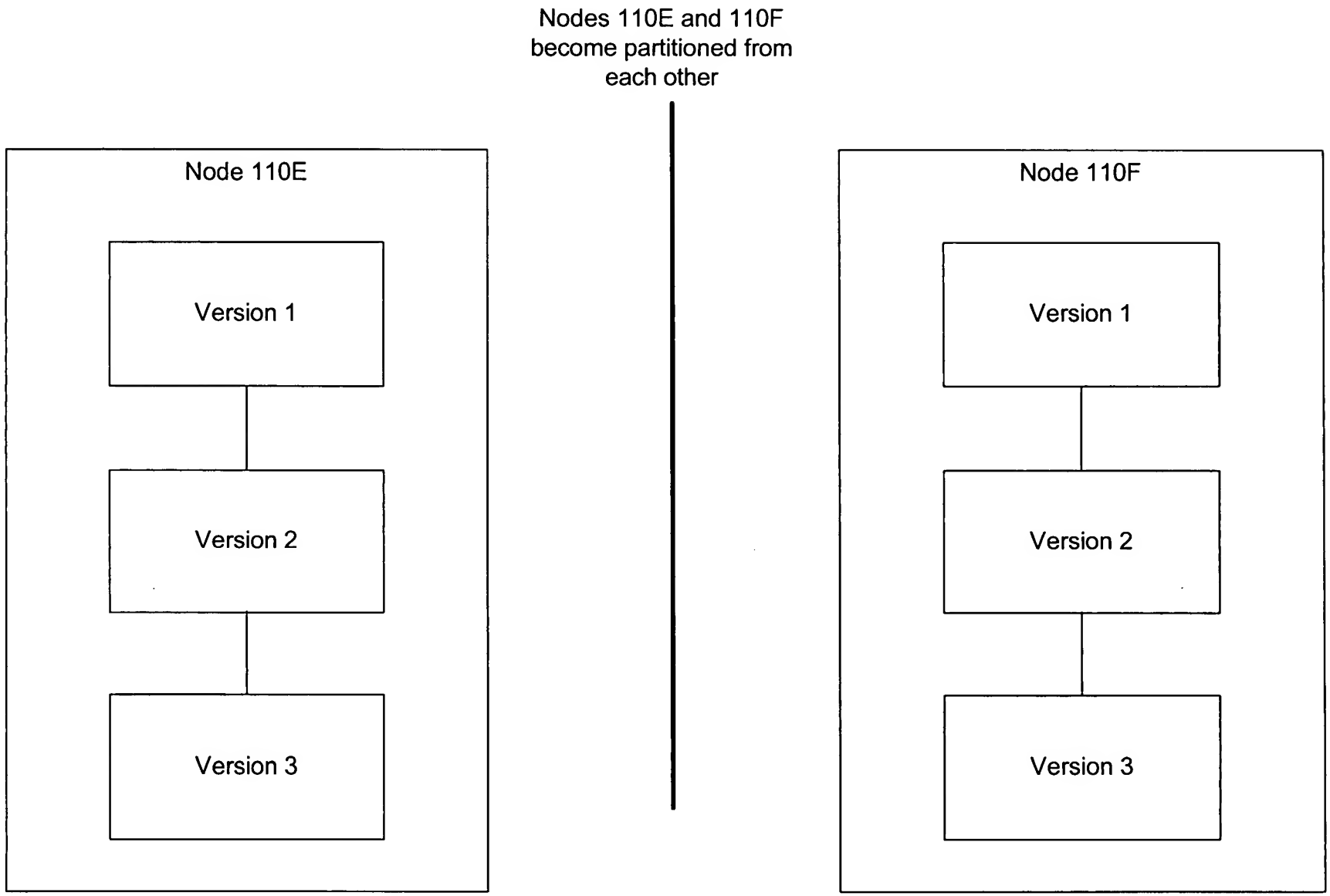
Nodes 110E and 110F become partitioned from each other
Node 110E
Version 1
Version 2
Version 3
Node 110F
Version 1
Version 2
Version 3

FIG. 3F

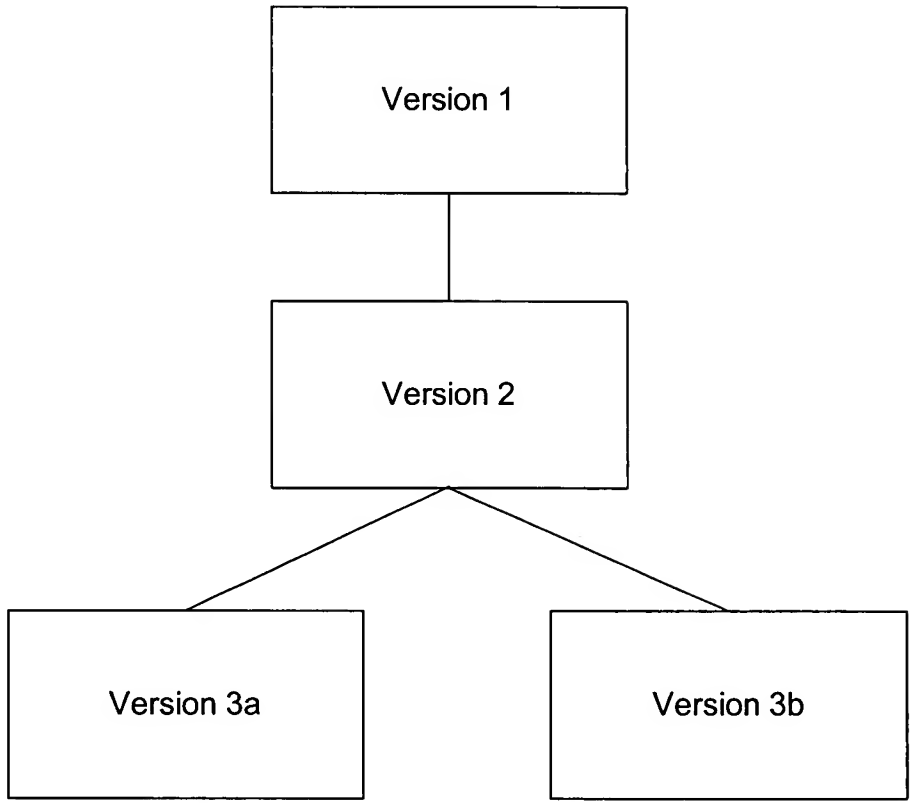

FIG. 3G

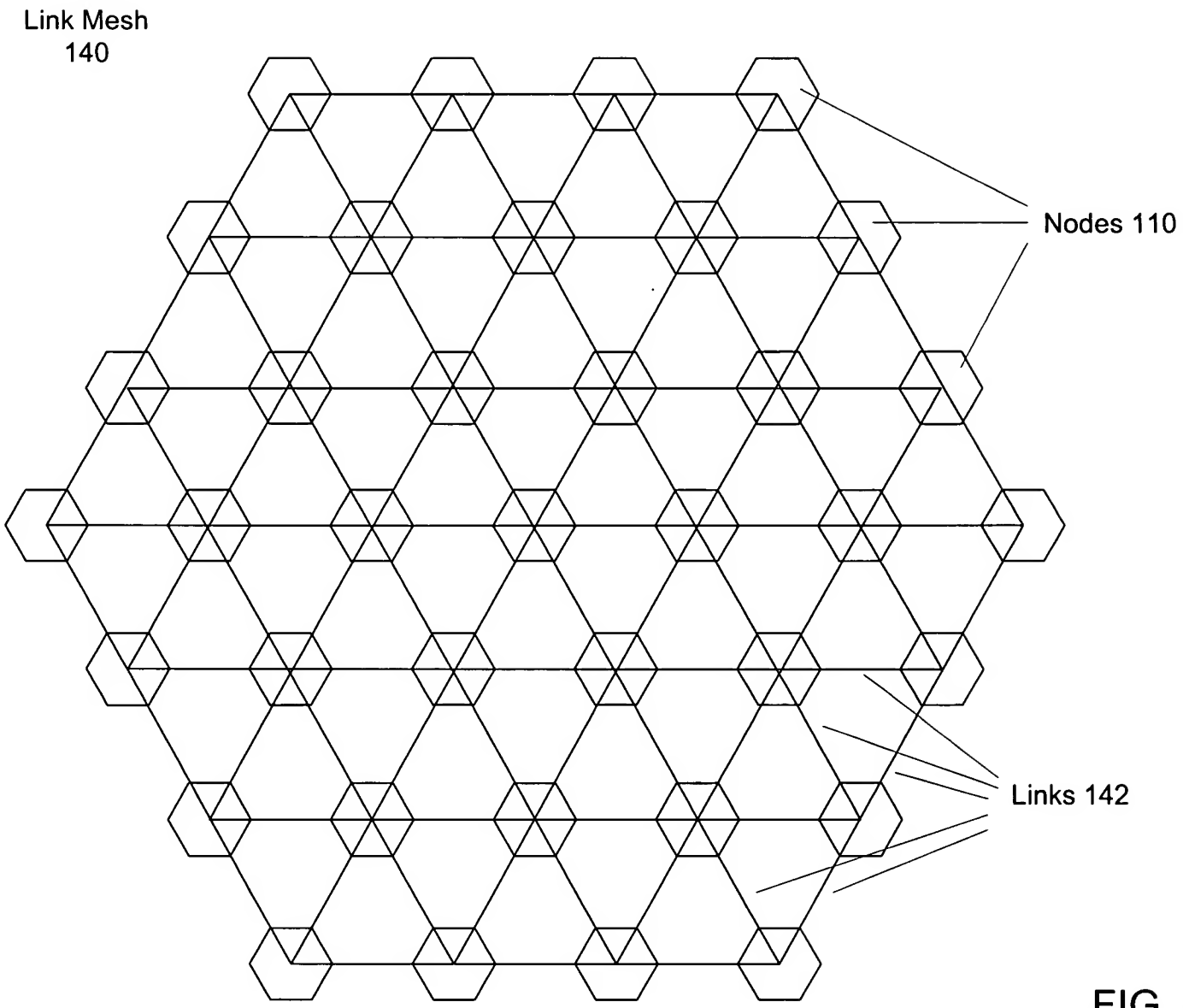

FIG. 4

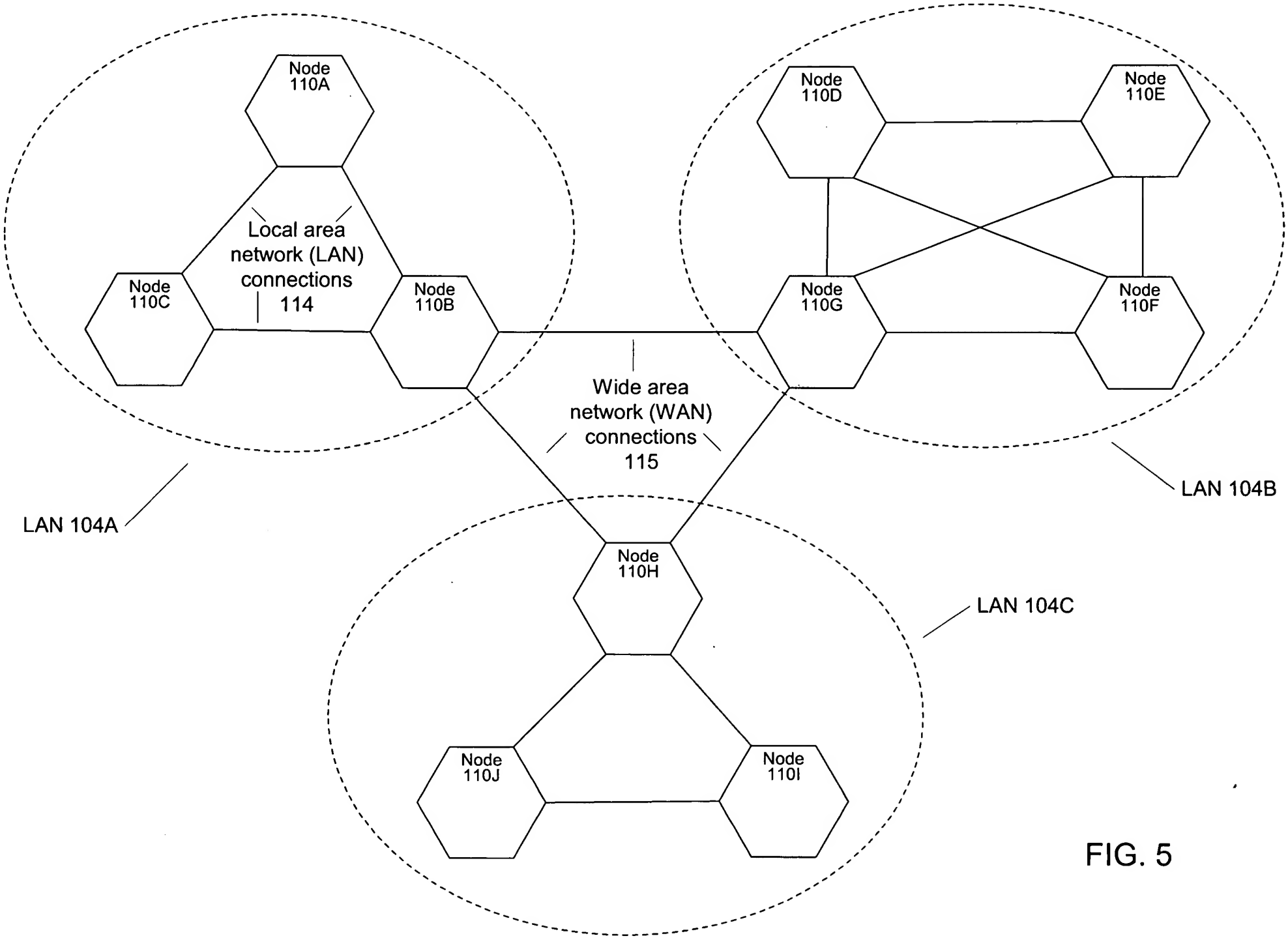
Node 110A
Node 110C
Node 110B
Local area network (LAN) connections 114
Node 110D
Node 110E
Node 110G
Node 110F
Wide area network (WAN) connections 115
LAN 104A
LAN 104B
LAN 104C
Node 110H
Node 110J
Node 110I

FIG. 5

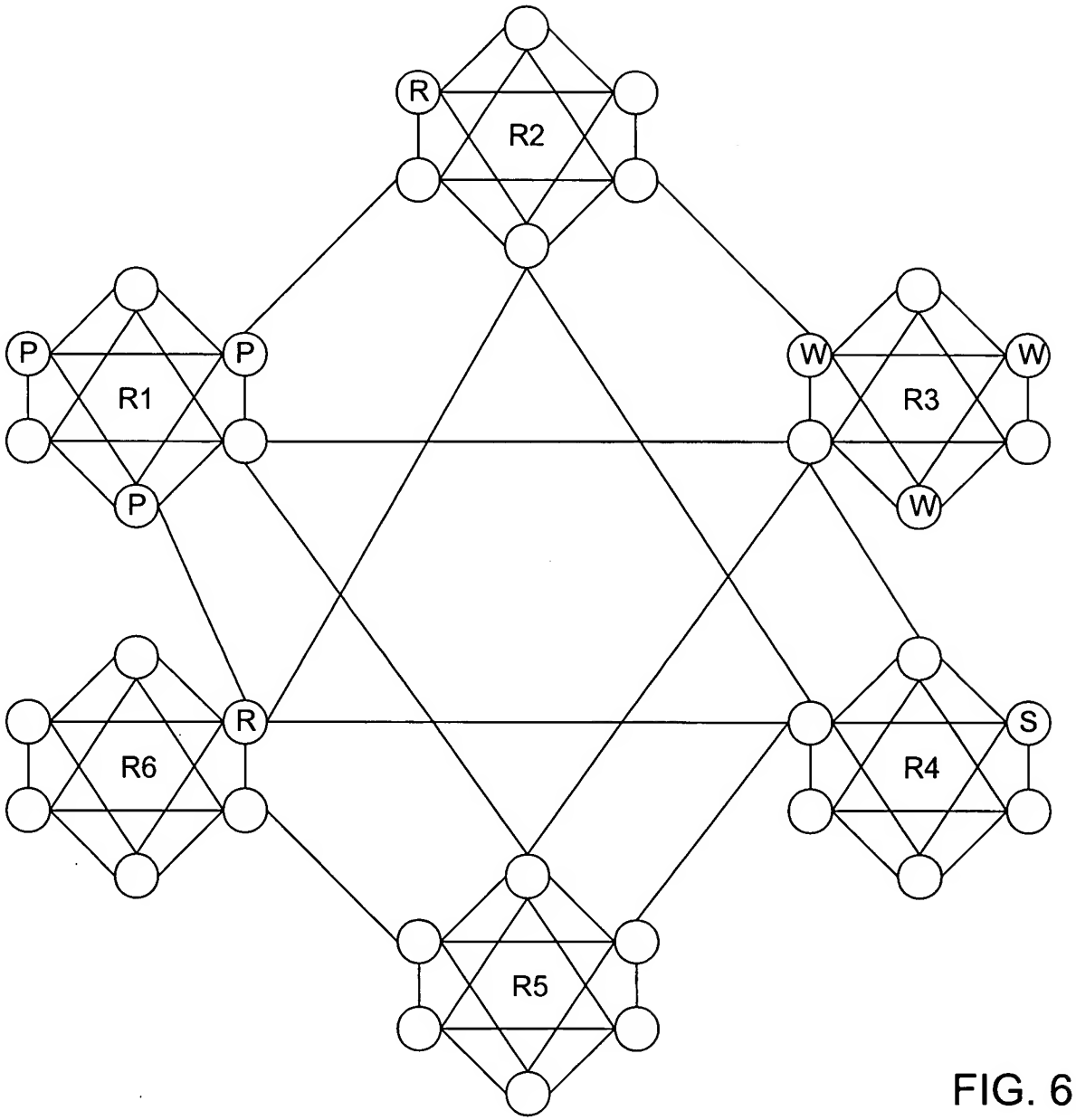

FIG. 6

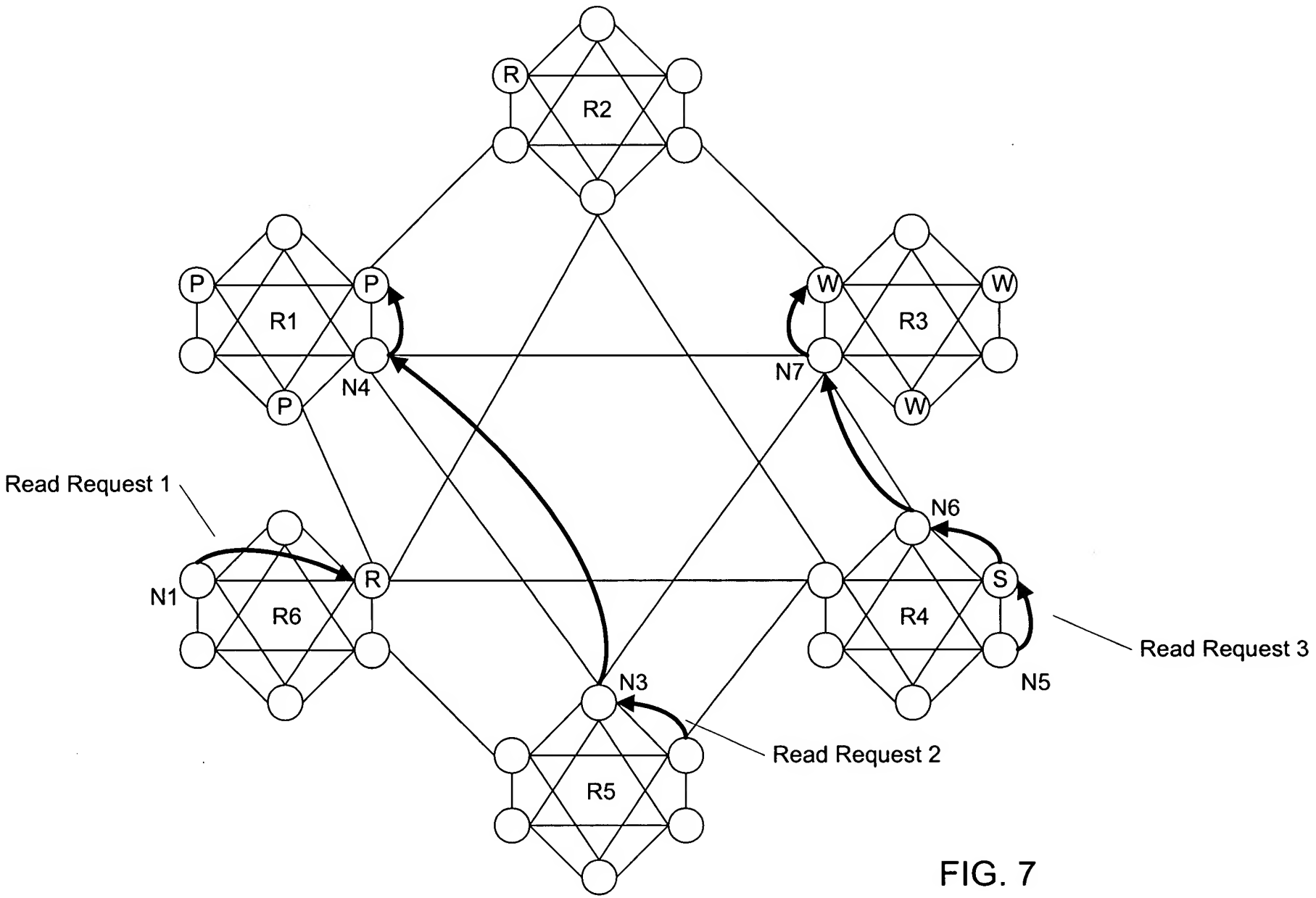
R
R2
P
P
R1
P
N4
W
W
R3
W
N7
Read Request 1
N6
N1
R
R6
S
R4
Read Request 3
N3
N5
Read Request 2
R5

FIG. 7

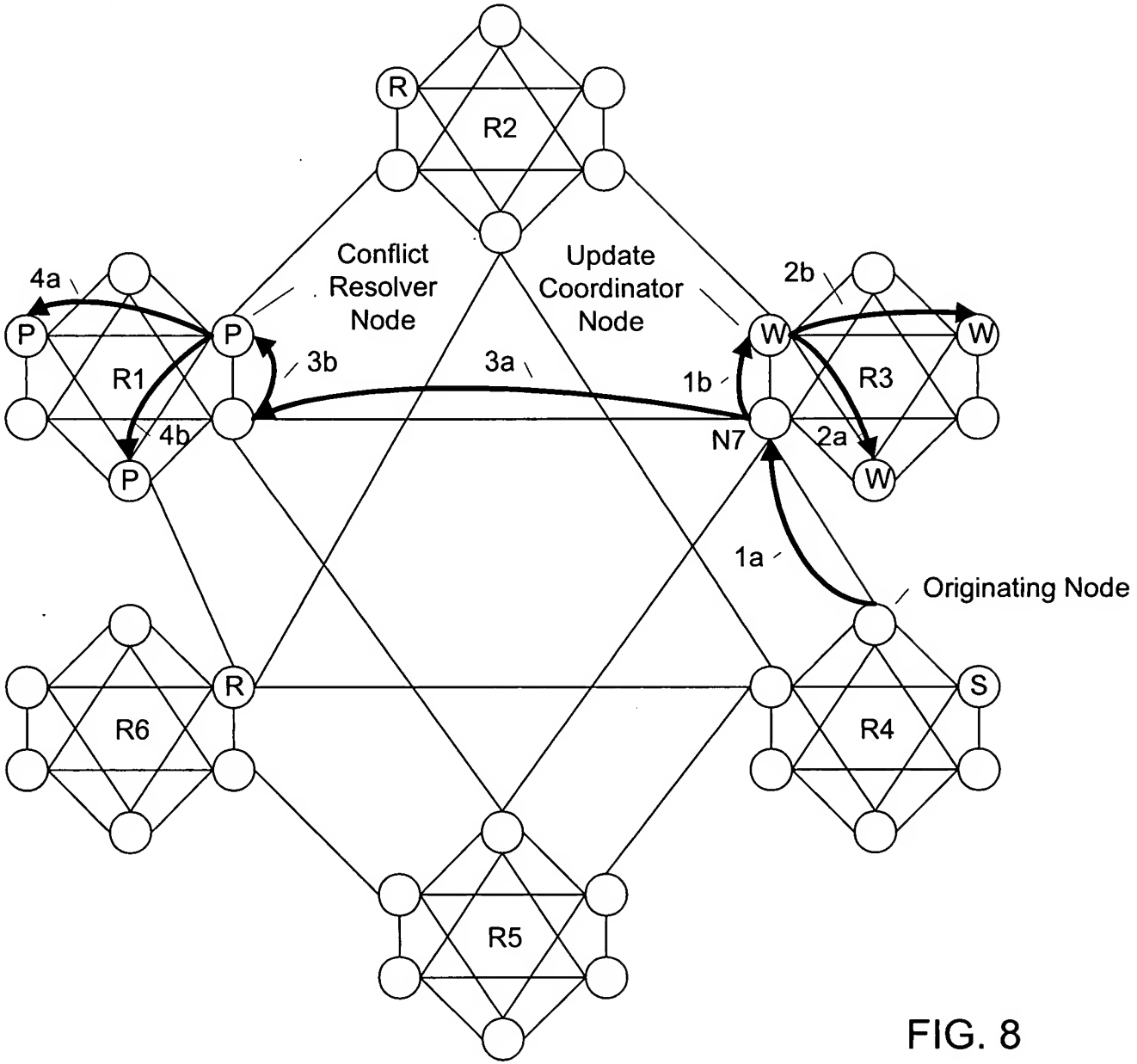
R
R2
Conflict
Resolver
Node
Update
Coordinator
Node
4a
2b
P
P
W
W
R1
3b
3a
1b
R3
4b
N7
2a
P
W
1a
Originating Node
R
S
R6
R4
R5

FIG. 8